ARCH 8903

Projects in Advanced Architectural Design

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` Master of Science in Advanced Architectural Design

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Abstract

I connected the territory of investigation in ecology with three different scales of projects under the time scope. These projects captured distinctive visions of understanding the ecological system nowadays and provided me with a broader perspective to investigate the realm of ecology which involved sustainable practices, soft infrastructures, materials research, environmental simulation, computational design, digital fabrication, and performance-driven design.

In ULI competition “the Router”, the project sought to maximize the commercial use while consuming as litle energy as possible through a series of ecological design method in an urban design scale. The design showed a grounded vision of present and relinked the possibilities of the future by laying out of current street context and renovated the original terminal building into another phase: smart transportation station. Meanwhile, the project develops the potential to reconnect the local public transit network by probing the road diet intervention. Four phases of development will bring a major retail corridor and offer new public space and four features of new buildings.

In the Vertical Urban Farming, the project demonstrated idealistically an extensive view of the intersection of waste energy and agriculture. Through developing a holistic, overall understanding of the vertical farming system, the architecture synthesizes the complex information about the system research focusing on the capacity and potential which considers economies of use, value, resource exchange, and mutualistic benefits. Within systems , waste and energy closely contribute not only to Roosevelt Island but possibly fit into New York’s larger infrastructural ecology.

Catskill Environmental Interpretation Center played a distinct role in perceiving the ecology system from the present time. The design studio integrated the embodied, sensorial, and material understandings triggered by climate in the Catskills region, and the cultural iconographies and narratives these have generated over time. Interrelationship between human and environment became a starting point to understand, interpret, and create a fundamental meaning of natural sensory.

Three projects indicated diverse viewpoints in the field of ecology and offered a broader perspective in the interrelationship between human and nature.

Biographical Sketch

Don (Chinglun) Chen is currently pursing his master degree at Cornell University MS in Advanced Architecture Design program (M.S.AAD) with an ecology concentration. He is the recipient of the Kittleman Graduate Award in Architecture, Art, and Planning.

Born in Taiwan, Don has a cross-cultural background in Taiwan, China, Germany, and US: he spent his childhood in Milwaukee and Chicago for five years; Taipei for 13 years, and Shanghai for 6 years.He earned his professional bachelor of architecture degree in Shanghai Jiao Tong University (2016) with a minor in business administration ;he also had an exchange semester study in Technical University Munich (2013).

During Don's undergraduate study, his studio instructor includes Mr. Jacob Van Rijs, the founder of the most pioneering architecture firm MVRDV in the Netherlands, and Mr. Yifeng Chen, founding partner of Atelier Deshaus, who was selected as the 2011 Design Vanguard.

Before coming to Cornell, he has been working in JJP Architect & Associates and Neri & Hu Design and Research Office for a wide range of projects, from residential interior design to ASUS Headquarter in Chongqing (the largest city in southwestern China).

Don is fluent in English, Mandarin Chinese, Taiwanese, and has a basic understanding of German.

Content

01 ULI Hines Competition: Router

the future urbanism with technology & sustainability

embodying the new urbanism principles and aligns with the city's objectives to strengthen itself in the age of digital and transit-based technologies

Figure 1: Site condition and design strategy

The Router is a destination nexus that unites the Central Business District in downtown Cincinnati and the waterfront area. It is a sustainable, tech-driven transit-oriented development with mixed land-use at the Banks. At the regional scale, the proposed project capitalizes on the prime location that connects the Northern region of Kentucky to the rest of the Cincinnati metropolitan area and strives to establish a stronger regional linkage that makes The Router the center of economic growth through innovation and culture. The Router embodies the new urbanism principles and aligns with the city's objectives to strengthen itself in the age of digital and transit-based technologies.

The DixieTerminal: Multimodal Smart Transportation Station

The Router leverages the Great American Insurance Group Building, historically part of the former Dixie Terminal, and retro ts the property to become the region's first smart transit hub for advancing transportation services. It is envisioned to reconnect the local transit system, support the operation of the new demand-driven ride-sharing services (Uber Bus) and electric vehicle, as well as to promote the research and development of future smart transit specifically in connected and autonomous vehicles. The Router prompts partnership with companies including Uber, Tesla, and Google in developing the driverless technology.

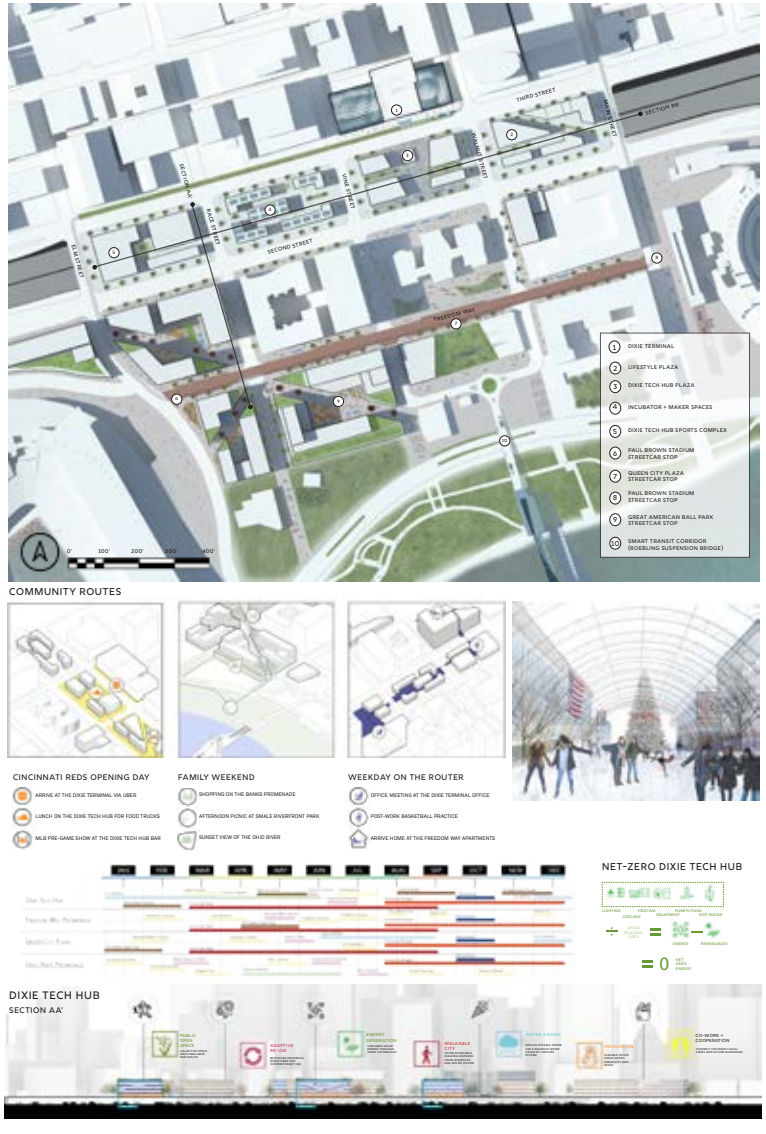

Figure 2: Ecological strategy in design

This concept proposes the John A. Roebling Suspension Bridge to become exclusively used for ride sharing, electric and smart vehicles, encouraging more sustainable transportation modes between Cincinnati and Kentucky, and reducing traffic through the Banks to create a people-centered experience.

Reconnecting the Local Public Transit Network

The Router redirects the Cincinnati Connector streetcar to expand its destination throughout the site. The extension of the streetcar route will travel west on Third Street to promote a road diet intervention, increasing pedestrian traffic from the Central Business District to the Banks. The new RT-Ride mobile application allows users to obtain real-time information on all types of transportation on site, which includes the demand-driven Uber Bus, Cincinnati Connector, GoMetro Bus, shared bikes as well as parking spaces availability and status of electric vehicle charging stations.

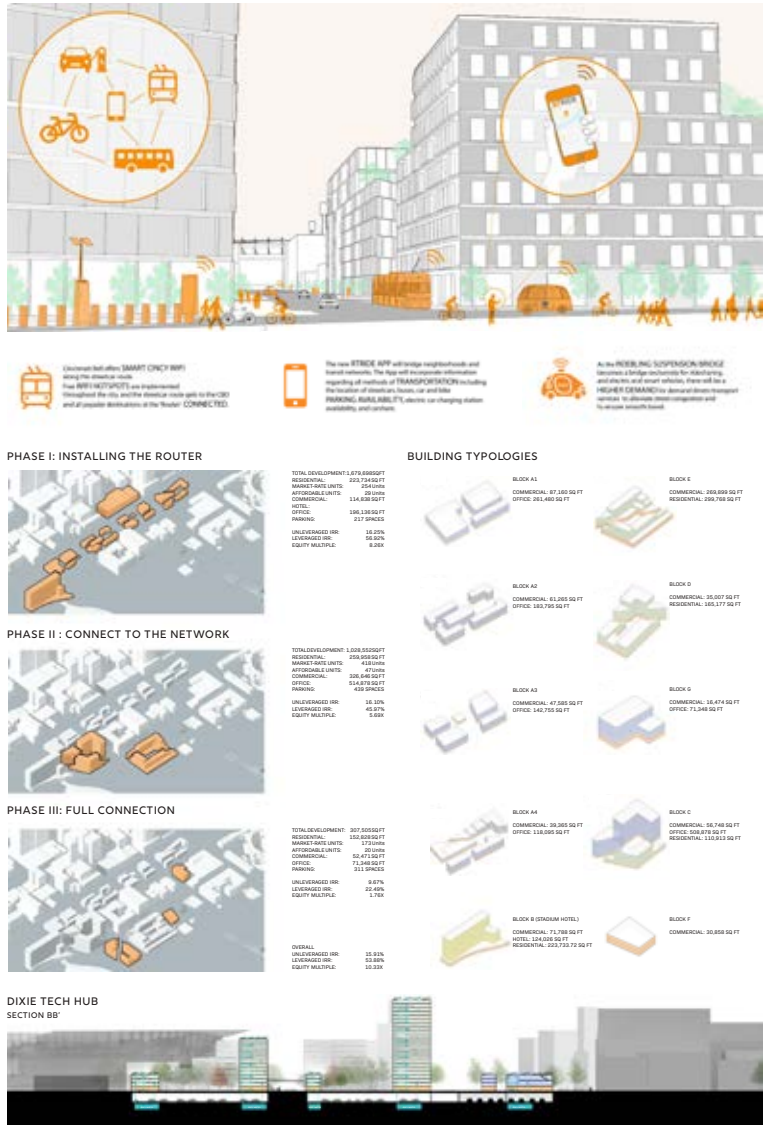

Figure 3: Network and property development

Sustainable Urbanism: Dixie Tech Hub on Fort Washington Way

The Router proposes to cap the Fort Washington Way to create a more cohesive landscape and pedestrian experience through the Dixie Tech Hub. The four parcels composing Dixie Tech Hub each have a unique theme and offers a public plaza with different characters. The 'Entertainment' precinct actively incorporates sports facilities such as gyms and indoor basketball courts, entertainment experiences of clubs and bars. The 'Technology' precinct offers extensive co-working spaces, indoor and outdoor venues for new technology displace and exhibitions. In the 'Celebration' precinct, the central public plaza hosts seasonal events and transforms into various functions such as a skating rink in the winter and farmers market in the fall. The 'Lifestyle' precinct supports the daily needs of residents in the surrounding neighborhood and offers various options for food and necessities.

Property Development

The mixed-use development along the banks includes hotels, condos, apartments, retail, and offices. The Freedom Way Boulevard becomes activated to become a major retail corridor for pedestrians with vibrant street activities, linking the Paul Brown Stadium and Great American Ball Park from east to west. The new development is elevated with ample parking spaces in the bottom. To incentivize and support the use of electric vehicles, all parking lots in The Router are installed with electric vehicle charging stations. The preservation and protection of the cultural heritage of sites have required design strategies that incorporate extant structures, significant vegetations, and other site features, creatively and sensitively reprogramming these elements for future uses.[1]

02 Urban Vertical Farming

architectural and infrastructural possibilities that emerge from the close examination of intersecting systems of waste and energy

Will the farming machine become the future farming prototype?

Figure 4: Physical model in section

Within an expanded understanding of ecology, what are the architectural and infrastructural possibilities that emerge from the close examination of intersecting systems of waste and energy? This studio explores an expanded idea of ecology that encompasses not just the natural environment but also recognizes the entanglements of human-made products and byproducts within its definition. In the context of global warming and the Anthropocene, the studio posits ecology as a circular system of inputs and outputs that may include everything from organic materials such as water and soil to human trash and energy demands.

How might we harness, redirect, or otherwise engage the metabolic processes within these systems? The project situates its investigations at the new Cornell Tech campus on Roosevelt Island. Using the urban campus model as a demonstration site, we will examine major waste streams and open vs. closed loops to re-envision and exploit existing and potential systems. Roosevelt Island provides a unique urban configuration to explore opportunities for the island's self-reliance through augmentations of and additions to its systems. Rather than relying on externalization of unwanted outputs and waste, might it be possible to capture, redirect, and recover energy and material excesses towards a new integration of infrastructure and cultural life?

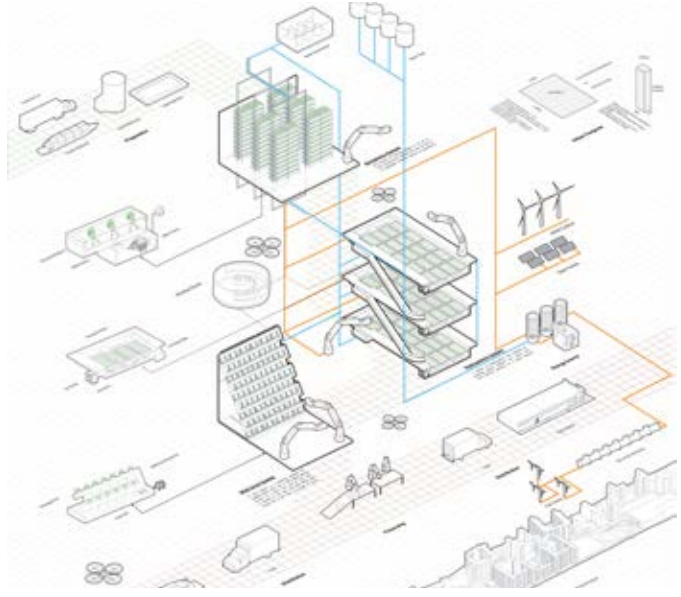

Figure 5: System drawing

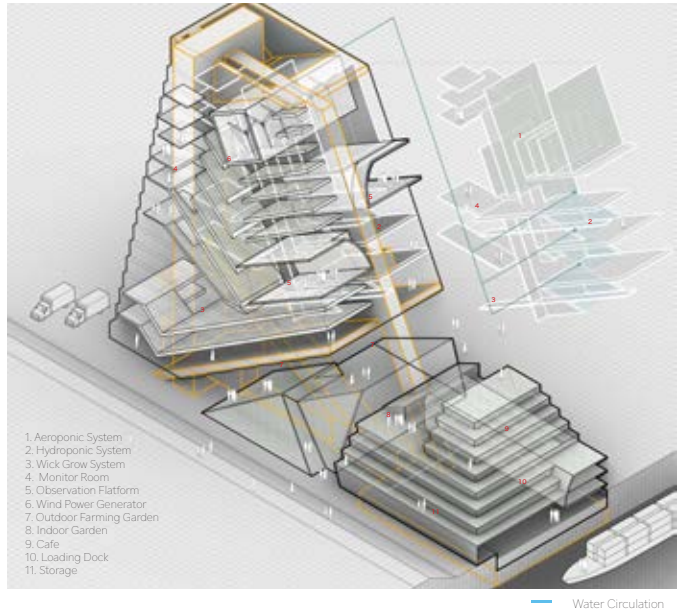

Figure 6: Ghost drawing

In vertical farming, plants are grown indoors in vertically stacked layers. They are grown in nutrient-rich water with artificial light sources. The main advantage of vertical farming is the freshness of food: crops can be picked, packed, and delivered to markets within two to eight hours. There is no need to store and ship the food. In addition, plants are available all year round because they are kept at stable temperatures. Also, farmers can reduce their use of chemical fertilizers and pesticides. In vertical farming, since crops are stacked in layers, more can be grown in less open space. Vertical farming uses up 70% less water than open-field farming.Three challenges of vertical farming are:
(1) Growing crops indoors requires artificial light that uses electricity, which is expensive.
(2)Grow lamps give off heat. The heat requires that vertical plants be more spread out.
(3)Currently the overall costs are expensive due to the cost of land in a city and the LED lights.

The system drawing develops a holistic, overall understanding of the vertical farming system; it also synthesizes the complex information about the system research focusing on the capacity and potential which consider economies of use, value, resource exchange, and mutualistic benefits. Within systems , waste and energy closely contribute not only the Roosevelt Island but also possibily New York's larger infrastructural ecology.

The ghost refines the design while exploring the opportunities of site and program. Spatial and experiential configuration are indicative of the vertical farming system. It also creates an image of interior space versus exterior space, edge versus center, and the interface between human and system.This system thus enriches life on the island in a range of architectural terms and generates further architectural responses.

Figure 7: Wick grow system and outdoor farming detail

Figure 8: Processing, disribution, and electricity generator detail

Figure 9: Wind turbine, vertical circulation, and aeroponics system detail

In short, Urban Vertical Farming presents a possible solution for food supply and sustainability between architecture and infrastructure. The project oriented itself from the material and energy needed for a certain amount of population to consume and influenced the exploration of opportunities for the island's self-reliance under a unique urban context.

03 Environmental Interpretation Center

Catskill Center for Fly Fishing Exhibition

capturing the natural phenomenon through the lens of human's activities

Figure 10: Exterior view of the architecture

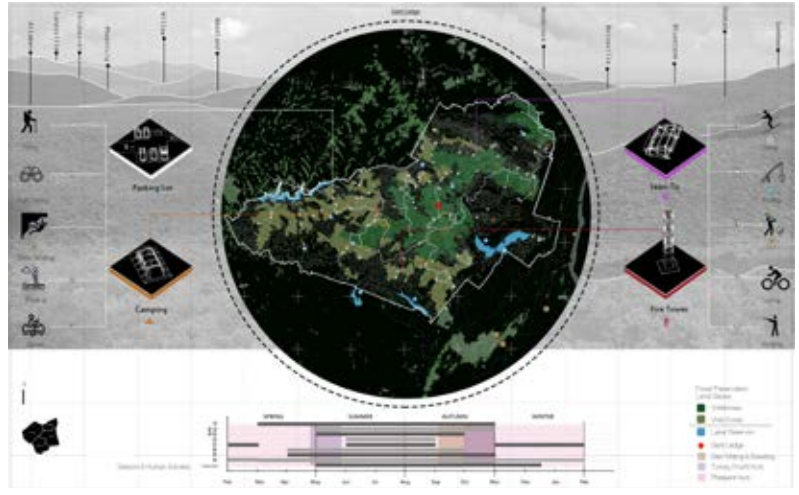

Figure 11: Mapping of the human activties in the Catskill region

Catskill Environmental Interpretation Center expresses a vision of the dialogue between human and nature. The Catskills is a region of the northeastern United States shaped by virtually every form of 'nature-culture' of the last 250 years because of several landscape appropriations by the metropolis that lies 100 miles to the south, which have cast the region as, alternately, a scenographic, climatic, religious, geological, agricultural and hydrological'resource. This continues as concerns about climate change become overlaid on this already-multilayered environmental history. Instead of adjudicating between these two interpretations of the region, this project seeks to explore a future for it by working creatively with the underlying – and historic -- links between them, through the design of a new Center for Environmental Interpretation.

The design started by using the lens of 'environmental atmosphere' through two exercises of collage and information representation. 'Atmosphere' is better described as an aura, something 'between things', felt and sensed rather than identified and thought. In the first exercise, "interrelationship between human activity and nature" mapped the potential of Catskill region under the human's intervention. It is as much a result of bodily sensations and socially-produced recognition as it is a matter of material phenomena that seems to relatethem. The mapping also presented the seasonality and engagement of environmental histories that would mutually change our understanding of the region's future.

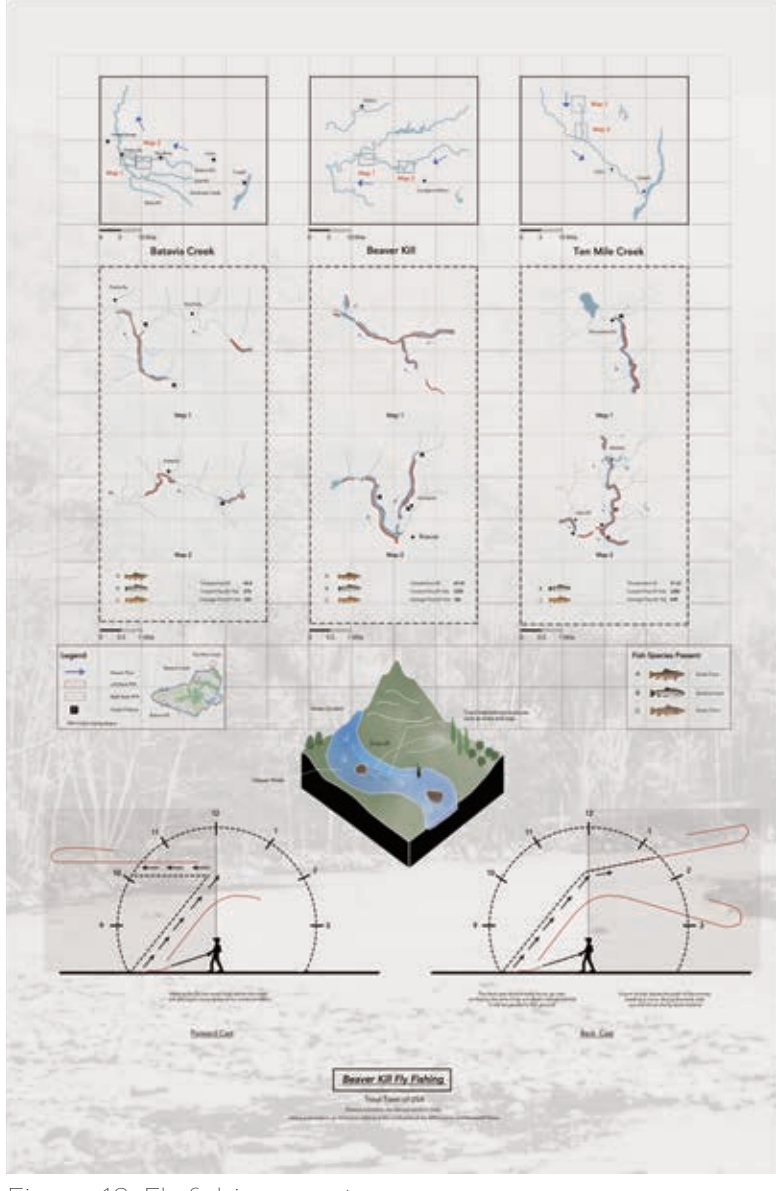

Figure 12: Fly fishing montage

Figure 13: Fly fishing at Beaver Kill

Beaver Kill Fly Fishing Montage

In the exercise of Montage, it abbreviated the embodied and sensorial understandings triggered by climate and neutral phenomenon in the Beaver's Kill region, and the cultural iconographies and narratives these have generated over time. "Fly Fishing" has been an important human activity in Beaver's Kill. Casting the rod, selecting the location, catching the fish indicated a rich understanding of "how to read the flow and water". The fly fisher can be a symbol of the person who perceives the phenomenon of nature in his/ her sophisticated experience of knowing the nature.

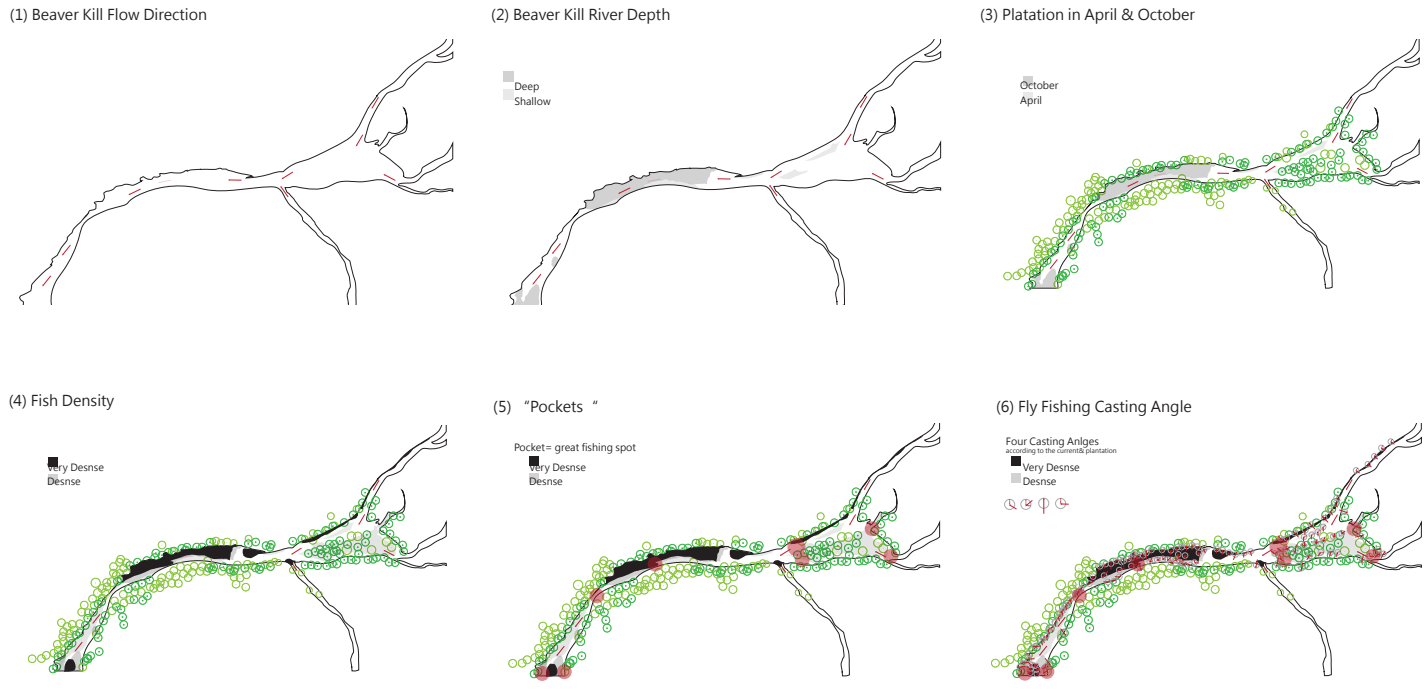

Figure 14: Rod casting angle and water flow

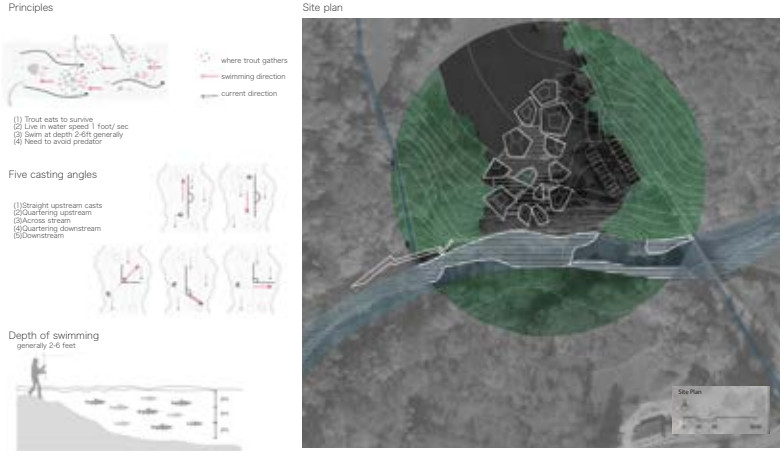

Figure 15: Fish distribution& site plan

Interrelationship between plantation & fly fishing casting angles

As the design dives into fly fishing, "flow reading" played an inevitable role for fisher to select the best location to catch the fish. Generally speaking, the flow included several factors, speed, temperature, plantation, and direction. These factors directly influenced the distribution of fish in four seasons, so did the casting angles from fishers. However, the conclusion in the diagram was built on theoretical assumption.

Figure 16: Floor plan

Figure 17: Section

Architecture as a mediator to experience the nature

Exhibition rooms are embedded into a dynamic layout that responses to the flow of Beaver Kill. The in-between space offers visitors to view the surrounding nature .As people walk down to the south, they come closer to the Beaver Kill and have the opportunity to observe fly fisher's activities. Interiority and exteriority sometimes are ambiguous due to the center inner garden, so do the nature and artifact . Interpretation from flow which generates the space indicate the natural context of the history of fly fishing. None of the exhibition rooms are the same, which is a metaphor for stones and river.

Bibliography

1.Michael Van Valkenburgh Associates, Reconstructing Urban Landscapes (New York 2009), p7.